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ABSTRACT

An advanced General Education Program has been designed to prepare an individual with the information, concepts, and general knowledge required to successfully pass the American Council on Education's High School General Education Development (GED) Test. The Advanced General Education Program provides comprehensive self-instruction in each of the following areas: (1) Correctness and effectiveness of Expression, (2) Social Studies, (3) Natural Sciences, (4) Interpretation of Literary Materials, and (5) General Mathematics. This document discusses fraction word problems, decimal word problems, and percentage word problems. (CK)

PM 431 - 25

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ADVANCED GENERAL EDUCATION PROGRAM

A HIGH SCHOOL SELF-STUDY PROGRAM

SOLVING FRACTION WORD PROBLEMS

LEVEL: I
UNIT: 8
LESSON: 1

MC017170

U.S. DEPARTMENT OF LABOR
MANPOWER ADMINISTRATION, JOB CORPS
NOVEMBER 1969

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NOVEMBER 1969

7. On a map, 1 3/4 inches represents 210 miles. How long will a line that represents 530 miles be?

8. What is the perimeter of a garden that has two sides that are 6 1/8 feet long, and two sides that are 4 3/4 feet long?

9. What is the inside diameter of a tank when the outside diameter is 15 1/16 feet and the walls are 1 3/8 feet thick?

10. Out of 102 test items, 98 were answered correctly. What fractional part were answered incorrectly?

11. 56 out of 140 students are girls. What fractional part are girls? What fractional part are boys?

Time completed _____

WHEN YOU HAVE FINISHED THIS TEST, WRITE DOWN THE TIME. THEN TAKE THE LESSON TO YOUR INSTRUCTOR OR HIS ASSISTANT FOR CHECKING. WAIT UNTIL THE LESSON IS APPROVED BEFORE GOING ON TO THE NEXT LESSON.

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In real life, problems involving fractions are seldom given to you written out with a symbol telling you whether to add, subtract, multiply or divide.

For example, on a job a foreman may tell you to spend 1/4 of your time doing one thing, 1/3 doing another task, and the remainder of time cleaning up your area.

In order to solve the problem, you have to be able to pick out the numbers from the statement and decide which operation (addition, subtraction, multiplication, division) to carry out in order to find out how many hours to spend on each task.

Also, you may know that many articles that you read in newspapers or magazines express numbers of people, numbers of dollars, or numbers of cars or other products in terms of decimal fractions, and it is important for you to be able to understand such fractions when they are given in sentence form rather than in a "Solve this Problem" form.

A third kind of number that will be very useful to you in your reading and studying, and also in your day-to-day world of earning and saving money, is <u>percent</u>. Your income tax withholding is usually some percent of your total salary, and interest on loans is figured as a percent of the total amount borrowed. Also, if you buy anything on the installment plan, you will need to figure out from the contract how much interest you will be paying.

The lessons you will now take will give you practice using proper fractions, decimals and percents in some of the ways you will later actually use them when you are working at a job, buying a car or furniture. They will also help you when you are reading for your own enjoyment and information. Practice in these problems will also help you to prepare for the GED test that you will be taking in a few months.

Time completed _____

1. Up to the last event of a track meet, the first team had 27 1/2 points, the second team had 22 1/2 points, the third team 22 points. In the last event of the track meet, the first team made 1 1/2 points, the second team 2 points, the third team 3 1/2 points. Which team won the meet?

2. What is the average of these lengths:
2 1/2 inches; 7/8 inches; 1 1/4 inches; 13/16 inches; 1 3/4 inches?

3. If you can assemble a motor in 6 1/2 hours, and someone else does the same job in 7 1/4 hours, how much longer does it take him to do the job, than it does you.

4. A pilot was forced to land 525 miles from his destination after flying 3 hours. There was a 1 1/2 hour delay. If the pilot arrives on schedule 6 3/4 hours after his original take-off, how fast must he fly?

5. NUMBER these steps in the correct order.

   a. _____ decide which operation(s) should be performed

   b. _____ pick out the facts

   c. _____ pick out the question(s)

   d. _____ read the problem

   e. _____ solve the problem

6. A house worth $17,500 was assessed at 1/4 of its value. What was the assessed value?

1. PREVIEW FRAME In many of your previous lessons you have studied fractions and mixed numbers. In the frames you are about to take, you will practice using the fractions you have learned to solve some word problems. NO RESPONSE REQUIRED	GO ON TO THE NEXT FRAME
2. It will help you to solve difficult word problems if you carry out the steps given below in the order shown. First, READ the problem. Second, PICK OUT the facts. Third, PICK OUT the question. Fourth, DECIDE which arithmetic operation to do. Fifth, SOLVE the problem. Try it with this problem. First, READ the problem: Susan made a 2-piece dress. She used 2 3/8 yards for the blouse and 1 3/4 yards for the skirt. How much material did she use? Now, PICK OUT the facts. Two facts for this problem are: The dress has 2 pieces The blouse uses 2 3/8 yards What is the other fact?	The skirt uses 1 3/4 yards

MASTERY TEST

Time started _____

3. The facts are: The dress has 2 pieces The blouse uses 2 3/8 yards The skirt uses 1 3/4 yards Susan made a 2 piece-dress. She used 2 3/8 yards for the blouse and 1 3/4 yards for the skirt. How much material did she use? Now PICK OUT the question: ☐ How much material was left over? ☐ How much material was used altogether?	How much material was used . . . ?
4. The facts are: the dress has 2 pieces, one 2 3/8 yards and the other 1 3/4 yards. The question is: How much material was used altogether? Now, by thinking about the facts and the question, DECIDE which operation to perform and CHECK it below: ☐ addition ☐ division ☐ multiplication ☐ subtraction	addition
5. Susan make a 2-piece dress. She used 2 3/8 yards for the blouse and 1 3/4 yards for the skirt. How much material did she use? Now, SOLVE the problem and WRITE your answer here:	2 3/8 = 2 3/8 +1 3/4 = 1 6/8 3 9/8 = 4 1/8 4 1/8 yards - answer

39.

How much higher is Bob's average than Ed's? _____

$$\begin{array}{rl} 91 & = 90\ 6/6 \\ -\ 85\ 1/6 & = 85\ 1/6 \\ \hline & 5\ 5/6 \end{array}$$

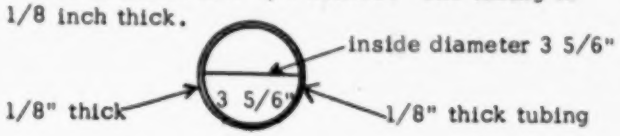
Time completed _____

YOU HAVE NOW FINISHED THE FIRST PART OF THIS LESSON. WRITE DOWN THE TIME. THEN, AFTER YOU HAVE REVIEWED THE MAIN IDEAS IN THE FOLLOWING SUMMARY, TAKE THE MASTERY TEST AT THE END OF THE BOOKLET.

6.

Now, READ this problem:

What is the outside diameter of tubing when the inside diameter is 3 5/6 inches? The tubing is 1/8 inch thick.



What are the facts?

Inside diameter: 3 5/6 inches

Tubing: 1/8 inch thick

What is the question?

What is the outside diameter?

What operation should you perform?

- ☐ addition
- ☐ division
- ☐ multiplication
- ☐ subtraction

addition

7.

What is the outside diameter of tubing when the inside diameter is 3 5/6 inches. The tubing is 1/8 inches thick.

Now SOLVE the problem:

The outside diameter is_____.

$$\begin{array}{rl} 3\ 5/6 = & 3\ 20/24 \\ 1/8 = & 3/24 \\ +\ 1/8 = & 3/24 \\ \hline & 3\ 26/24 = 4\ 2/24 = 4\ 1/12 \end{array}$$

4 1/12 inches - answer

36. What was the average weight loss per month? _____	16 3/4 ÷ 3 = 67/4 x 1/3 = 67/12 = 5 7/12 pounds - answer
37. FIND the average: 9 1/10; 3 2/5; 7 1/2 _____	9 1/10 = 9 1/10 3 2/5 = 3 4/10 7 1/2 = 7 5/10 19 10/10 = 20 20 ÷ 3 = 6 2/3 6 2/3 - answer
38. Bob's test grades were 90; 95 1/2; 87 1/2. Ed's test grades were 92; 73 1/2; 90. What is Bob's average? _____ What is Ed's average? _____	90 + 95 1/2 + 87 1/2 = 272 2/2 = 273 273 ÷ 3 = 91 - answer 92 + 73 1/2 + 90 = 255 1/2 255 1/2 ÷ 3 = 511/2 x 1/3 = 511/6 = 85 1/6 85 1/6 - answer

8.

READ this problem:

> The express train between Washington, D.C. and New York takes 2 3/4 hours. Another train takes 3 1/4 hours. How much time could you save in going from New York to Washington by taking the express train instead of the other train?

What are the facts?

express train: 2 3/4 hours
other train: 3 1/4 hours

What is the question?

How much time could you save in going from New York to Washington by taking the express train instead of the other train?

What operation should you perform?

- ☐ addition
- ☐ division
- ☐ multiplication
- ☐ subtraction

subtraction

SOLVE the problem:

$$\begin{array}{r} 3\ 1/4 = 2\ 5/4 \\ -\ 2\ 3/4 = 2\ 3/4 \\ \hline 2/4 = 1/2 \end{array}$$

1/2 hour - answer

34.

Ellen is 5' 8 1/2" tall; Dolores is 5' 2 1/8" tall; Gloria is 5' 1/2" tall. What is the average height of the 3 girls?

The first operation to perform in finding an average is:

- ☐ addition
- ☐ division
- ☐ multiplication
- ☐ subtraction

addition

What is the total height of the 3 girls? _____

5' 8 1/2" = 5' 8 4/8"
5' 2 1/8" = 5' 2 1/8"
5' 1/2" = 5' 4/8"
15' 10 9/8"

15' 11 1/8" - answer

The second operation in finding an average is _____

division

The average height is _____

15 ÷ 3 = 5'
11 ÷ 3 = 11/3 = 3 2/3 = 3 16/24"
1/8 ÷ 3 = 1/24 = 1/24"

5'
3 16/24"
+ 1/24"
5' 3 17/24"

5' 3 17/24" - answer

35.

3 months ago Mary weighed 140 1/2 pounds. She now weighs 123 3/4 pounds.

How much weight did she lose?

140 1/2 = 140 2/4 = 139 6/4
- 123 3/4 = 123 3/4 = 123 3/4
16 3/4

16 3/4 pounds - answer

9.

READ this problem:

What is the inside diameter of tubing when the outside diameter is 4 2/5 inches? The tubing is 1/15 inch thick.

What are the facts?

outside diameter: 4 2/5 inches

tubing: 1/15 inch

What is the question?

Find the inside diameter.

To solve this problem you would:

- ☐ add
- ☐ divide
- ☐ multiply
- ☐ subtract

add

subtract

SOLVE the problem:

1/15 + 1/15 = 2/15

4 2/5 = 4 6/15

\- 2/15 = 2/15

4 4/15

4 4/15 inches - answer

32.

A rectangle has two sides 3 1/4 inches long and two sides 1 3/8 inches long. What is the perimeter of the rectangle?

The length of the two sides 3 1/4" long is _____

3 1/4 + 3 1/4 = 6 2/4 = 6 1/2

6 1/2 inches - answer

The length of the two sides 1 3/8" long is _____

1 3/8 + 1 3/8 = 2 6/8 = 2 3/4

2 3/4 inches - answer

The perimeter of the rectangle is _____ inches.

$$\begin{array}{r} 2\ 3/4 = 2\ 3/4 \\ +\ 6\ 1/2 = 6\ 2/4 \\ \hline 8\ 5/4 = 9\ 1/4 \end{array}$$

9 1/4 - answer

33.

What is the perimeter of a box which has two sides 6 1/8 inches long and two sides 2 2/3 inches long?

_____

6 1/8 + 6 1/8 = 12 2/8 = 12 1/4

2 2/3 + 2 2/3 = 4 4/3 = 5 1/3

$$\begin{array}{r} 12\ 1/4 = 12\ 3/12 \\ +\ 5\ 1/3 = 5\ 4/12 \\ \hline 17\ 7/12 \end{array}$$

17 7/12 inches - answer

10.

READ this problem:

Jim had a rod 11 1/2 feet long. He needed 4 pieces measuring 3 1/8 feet, 5 1/2 feet, 3/4 foot, 1 2/3 feet. How much of the rod did he use? How much was left over?

What are the facts?

rod: 11 1/2 feet
4 pieces: 3 1/8 feet, 5 1/2 feet
3/4 foot, 1 2/3 feet

What is/are the question(s)?

- ☐ How long is the rod?
- ☐ How much of the rod did he use?
- ☐ How much was left over?

How much of the rod did he use?
How much was left over?

What operation(s) will you need to perform?

- ☐ addition
- ☐ division
- ☐ multiplication
- ☐ subtraction

addition

subtraction

SOLVE the problem:

3 1/8 = 3 3/24

5 1/2 = 5 12/24

3/4 = 18/24

+ 1 2/3 = 1 16/24

9 49/24 = 11 1/24

11 1/2 = 11 12/24

- 11 1/24 = 11 1/24

11/24

11 1/24 feet used - answer

11/24 feet left over - answer

31.

Sometimes words you don't know can make a word problem difficult.

For example, READ the problem:

> "What is the perimeter of a triangle if the 3 sides measure 3 11/16 inches, 4 3/4 inches, and 5 5/8 inches?"

Perimeter is a key word. It means the distance around.

In order to solve this problem you would:

- ☐ add the 3 sides
- ☐ divide one side by another
- ☐ multiply the 3 numbers
- ☐ subtract 1 side from the other 2

The perimeter is _____

add the 3 sides

3 11/16 = 3 11/16
4 3/4 = 4 12/16
5 5/8 = 5 10/16

12 33/16 = 14 1/16

14 1/16 inches - answer

11.

NUMBER the steps in the correct order:

_____ decide which operation(s) to perform	4
_____ pick out the facts	2
_____ pick out the question	3
_____ read the problem	1
_____ solve the problem	5

12.

READ this problem:

From a 15 foot rod, 3 pieces measuring 1 3/4 feet, 7 1/3 feet, and 4 3/8 feet were cut. How much of the rod was left?

What are the facts ?

rod: 15 feet
3 pieces: 1 3/4 feet, 7 1/3 feet
4 3/8 feet

What is the question?

How much of the rod was left?

Which operation(s) must you perform?

- ☐ addition
- ☐ division
- ☐ multiplication
- ☐ subtraction

addition

subtraction

SOLVE the problem:

```
  1 3/4 = 1 18/24
  7 1/3 = 7  8/24
  4 3/8 = 4  9/24
  ---------------
        12 35/24 = 13 11/24

 15       = 14 24/24
-13 11/24 = 13 11/24
  ---------------
            1 13/24
```

1 13/24 feet left - answer

28. 175 out of 200 students passed the examination. What fraction of the students passed? _____	175/200 = 7/8 - answer
29. Out of 25 chances at bat, Joe hit 10. Out of 18, Sam hit 8. What fractional part did each hit? Joe _____ Sam _____	10/25 = 2/5 - answer 8/18 = 4/9 - answer
30. From Monday through Thursday, Tom worked 37 1/2 hours; Jim 39 3/4 hours; Stewart 34 hours. On Friday Tom worked 8 hours; Jim 6 1/2 hours; Stewart 10 3/4 hours. Who worked longest that week? _____	Tom 37 1/2 + 8 = 45 1/2 hours Jim 39 3/4 + 6 2/4 = 45 5/4 = 46 1/4 hours Stewart 34 + 10 3/4 = 44 3/4 hrs. Jim worked the longest - answer

13. READ this problem: From Chicago, Illinois to Atlanta, Georgia it takes 3 1/4 hours flying time. The plane averages 175 m.p.h. How far is it from Chicago to Atlanta? What are the facts? What is the question? What operation(s) should you perform? _____ SOLVE the problem:	flying time: 3 1/4 hours plane speed: 175 m.p.h. How far is it from Chicago to Atlanta? multiplication 3 1/4 x 175 = 13/4 x 175/1 = 2275/4 = 568 3/4 568 3/4 miles - answer
14. Carrying out a number of steps in a certain order is called using a <u>strategy</u> to attack a problem. Use the <u>strategy</u> you have learned to SOLVE this problem: At a concert, 1/6 of the seats were filled in an auditorium that has 1500 seats. How many people were in the auditorium? _____	250 1500 seats, 1/6 full How many people were in the auditorium? multiplication 1/6 x 1500 = 250 250 people - answer

24. On a map, 1 1/2" represents 225 miles. 1 inch represents how many miles? _____ 750 miles is represented by how many inches? _____	 225 ÷ 1 1/2 = 225/1 x 2/3 = 150 miles - answer 750 ÷ 150 = 5/1 x 1/1 = 5 5 inches - answer
25. 16 out of 30 students were girls. What fraction of the students were girls?	 16/30 = 8/15 - answer
26. On a map, 2 inches represents 300 miles. 1 inch represents how many miles? _____ 625 miles would be represented by how many inches? _____	 300 ÷ 2 = 150 miles - answer 625 ÷ 150 = 4 1/6" - answer
27. 15 out of 50 test questions were answered correctly. What fraction of the questions were answered correctly? _____ How many were wrong? _____ What fraction of the questions were answered incorrectly? _____	 15/50 = 3/10 - answer 50 - 15 = 35 - answer 35/50 = 7/10 - answer

15. Use the strategy you have learned to SOLVE this problem: The gym has 1200 seats, and 3/4 of the seats were filled. How many people were in the gym?	1200 seats, 3/4 full How many people were in the gym? multiplication 3/4 x 1200/1 = 900 900 people - answer
16. An airplane averaging 400 miles per hour flew from New York City to San Francisco in 6 1/2 hours. About how far is it from New York City to San Francisco? SOLVE this problem writing out the facts, question(s), and operation(s) if you wish:	400 x 6 = 2400 400 x 1/2 = 200 400 x 6 1/2 = 2400 + 200 = 2600 2600 miles - answer

22. How many pieces of piping 4 2/3 feet long can be cut from 65 pipes each 30 feet long? First, FIND how many pieces can be cut from 1 pipe. _____ Now, FIND how many pieces can be cut from 65 pipes? _____	 30 ÷ 4 2/3 = 30 ÷ 14/3 = 30/1 x 3/14 = 6 6/14 6 pieces - answer 6 x 65 = 390 390 pieces - answer
23. A dance floor is 20 1/2 feet wide. The boards to cover the floor are 5 1/3 inches wide. How many boards are needed to cover the floor? First, 12 inches is 1 foot. CHANGE 5 1/3 inches to feet. _____ Then, FIND how many 4/9 foot wide boards it will take to cover the whole floor. _____	 5 1/3 ÷ 12 = 8/3 x 1/6 = 8/18 = 4/9 5 1/3 inches = 4/9 foot 20 1/2 ÷ 4/9 = 41/2 x 9/4 = 369/8 = 46 1/8 boards 46 1/8 boards - answer

17. This recipe makes 1 dozen (12) biscuits: 2 cups flour 2 1/2 teaspoons baking powder 3/4 teaspoon salt 5 tablespoons shortening 3/4 cup milk You only want to make 1/2 the recipe. How much of each ingredient will you need? _____ cups flour _____ teaspoon baking powder _____ teaspoon salt _____ tablespoons shortening _____ cup milk	 1/2 x 2 = 1 cup 1/2 x 2 1/2 = 1/2 x 5/2 = 1 1/4 teaspoons 1/2 x 3/4 = 3/8 teaspoon 1/2 x 5 = 2 1/2 tablespoons 1/2 x 3/4 = 3/8 cup
18. 2 girls bought 3 1/2 lbs. of bananas. The bananas cost 12¢ per lb. How much did they pay for the bananas? 1 lb. costs 12¢ 3 lbs. cost _____¢ 3 1/2 lbs. cost _____¢	 3 x 12 = 36¢ 3 1/2 x 12 = 7/2 x 12 = 42¢ 42¢ - answer

19. A club gets $740 yearly from dues. 1/6 of this is spent for rent, 2/3 goes for charity work. How much is left over? The part of the dues spent is _____ The part left over is _____ The amount left over is _____	 1/6 + 2/3 = 5/6 1 - 5/6 = 1/6 1/6 x 740/1 = $123 1/3 $123 1/3 left over - answer
20. Joe bought 2 1/2 pounds of peanuts for 50¢. How much does a pound of peanuts cost? If 2 lbs. cost 50¢ 1 lb. costs _____¢ 2 1/2 lbs. cost 50¢ 1 lb. costs _____¢	 50 ÷ 2 = 25¢ 50 ÷ 2 1/2 = 50 x 2/5 = 20¢ 20¢ lb. - answer
21. How many yards of material 36 inches wide are needed to make 4 drapes each 6 feet long and 48 inches wide? 3 feet = 1 yard 6 feet = _____ yards 36 inches = 1 yard 48 inches = _____ yards How many yards does it take to make 1 drape? _____ How many yards does it take to make 4 drapes? _____	 6 ÷ 3 = 2 yards 48 ÷ 36 = 1 1/3 yards 1 1/3 x 2 = 2 2/3 yards 2 2/3 x 4 = 8/3 x 4/1 = 32/3 = 10 2/3 10 2/3 yards - answer

PM 431 - 26

ED 069988

ADVANCED GENERAL EDUCATION PROGRAM

A HIGH SCHOOL SELF-STUDY PROGRAM

SOLVING DECIMAL WORD PROBLEMS

LEVEL: I

UNIT: 8

LESSON: 2

U.S. DEPARTMENT OF LABOR
MANPOWER ADMINISTRATION, JOB CORPS
NOVEMBER 1969

U.S. DEPARTMENT OF LABOR
MANPOWER ADMINISTRATION, JOB CORPS
NOVEMBER 1969

1. PREVIEW FRAME The frames that follow will extend your working knowledge of decimal fractions, and also give you practice in using decimals in solving word problems. NO RESPONSE REQUIRED	 GO ON TO THE NEXT FRAME
2. A. 2.1 B. 2.11 C. 2.10357 The numbers above are decimal fractions. The dot in each number is called the decimal point. In a decimal fraction, each position to the right of a decimal point is called a <u>decimal place</u>. For example, the first decimal fraction shown above has one decimal place. How many decimal places does the second decimal fraction have? _____ How many does the third decimal fraction have? _____	 2 5
3. Decimal places are: ☐ to the left of a decimal point ☐ to the right of a decimal point A decimal fraction may consist of: ☐ four places or less ☐ four places or more	 to the right of a decimal point four places or less four places or more

1

4. The decimal place just to the right of a decimal point is called the <u>first</u> decimal place. The next decimal place to the right is called the <u>second</u> decimal place, the next is the <u>third</u> decimal place and the next is the <u>fourth</u> decimal place. In the decimal fraction 3.1485, what is the numeral in the: first decimal place? _____ second decimal place? _____ third decimal place? _____ fourth decimal place? _____	 1 4 8 5
5. FOOTNOTE FRAME Most decimal fractions with which you will be working will consist of four places, or less. Consequently, decimal fractions that consist of five places or more will not be discussed in detail in succeeding frames. NO RESPONSE REQUIRED	 GO ON TO THE NEXT FRAME

6.

35.0621

In the decimal fraction above, the numeral 6 is in the:

- ☐ first decimal place
- ☐ second decimal place
- ☐ third decimal place
- ☐ fourth decimal place

second decimal place

The numeral 2 is in the:

- ☐ first decimal place
- ☐ second decimal place
- ☐ third decimal place
- ☐ fourth decimal place

third decimal place

The numeral 0 is in the:

- ☐ first decimal place
- ☐ second decimal place
- ☐ third decimal place
- ☐ fourth decimal place

first decimal place

The numeral 1 is in the:

- ☐ first decimal place
- ☐ second decimal place
- ☐ third decimal place
- ☐ fourth decimal place

fourth decimal place

7.

In a decimal fraction, the numeral in the first decimal place stands for the number of tenths.

The numeral in the second decimal place stands for the number of hundredths.

The numeral in the third decimal place stands for the number of thousandths.

The numeral in the fourth decimal place stands for the number of ten thousandths.

.6425

How many tenths are there in the decimal fraction shown above? _____ 6

How many hundredths? _____ 4

How many thousandths? _____ 2

How many ten thousandths? _____ 5

5. Truck No. 1 is able to travel thirteen and eight tenths miles on a gallon of gasoline, and its tank can hold eighteen and four tenths gallons. Truck No. 2 is able to travel fourteen and three tenths miles on a gallon of gasoline, and its tank can hold sixteen and nine tenths gallons. Which truck is able to travel farther on a tank of gasoline? How much farther?

Time completed _____

WHEN YOU HAVE FINISHED THIS TEST, WRITE DOWN THE TIME. THEN TAKE THE LESSON TO YOUR INSTRUCTOR OR HIS ASSISTANT FOR CHECKING. WAIT UNTIL THE LESSON IS APPROVED BEFORE GOING ON TO THE NEXT LESSON.

* U. S. GOVERNMENT PRINTING OFFICE : 1970 O - 389-833

8.

The number of hundredths in a decimal fraction is shown by a numeral in the:

- ☐ first decimal place
- ☐ second decimal place
- ☐ third decimal place
- ☐ fourth decimal place

second decimal place

The number of tenths is shown by a numeral in the:

- ☐ first decimal place
- ☐ second decimal place
- ☐ third decimal place
- ☐ fourth decimal place

first decimal place

The number of thousandths is shown by a numeral in the:

- ☐ first decimal place
- ☐ second decimal place
- ☐ third decimal place
- ☐ fourth decimal place

third decimal place

The number of ten thousandths is shown by a numeral in the:

- ☐ first decimal place
- ☐ second decimal place
- ☐ third decimal place
- ☐ fourth decimal place

fourth decimal place

1. A storage room measures 15.6 feet by 10.2 feet, and another storage room measures 20.9 feet by 14.4 feet. Find the total storage space, to the nearest tenth of a square foot.

2. A tank that can hold 16.7 gallons is filled through a pipe at the rate of .9 gallons per minute. At the same time it loses .6 gallons per minute through an open tap. Find the time necessary to fill the tank, to the nearest tenth of a minute.

3. The floor space of a room measures seven and five hundredths by six and eleven hundredths yards. Carpeting is to be bought for the room at a cost of six dollars and twenty-three cents per square yard. What will the total cost of the carpeting be, to the nearest cent?

4. Jim earns $12.53 per day. Each day he spends $.80 on carfare, $2.50 on food and drink, $.10 on a newspaper and $.40 on cigarettes, and at night he rents a hotel room for $3.00. At the end of a day and a night, how much money does Jim have left over?

9. .3579 Because the number of tenths in a decimal fraction is shown by a numeral in the first decimal place, this decimal place is called the <u>tenths position</u>. Similarly, the second decimal place is called the <u>hundredths position</u>. The third decimal place is called the <u>thousandths position</u>. The fourth decimal place is called the <u>ten thousandths position</u>. In the decimal fraction shown above, what is the numeral in the: hundredths position? _____ ten thousandths position? _____ tenths position? _____ thousandths position? _____	

MASTERY TEST

Time started _____

11.

.023

.207

.5301

.37802

The decimal fractions above illustrate that the numeral in the tenths position may be:

- ☐ 0
- ☐ greater than 0

0
greater than 0

The numeral in the hundredths position may be:

- ☐ 0
- ☐ greater than 0

0
greater than 0

The numeral in the thousandths position may be:

- ☐ 0
- ☐ greater than 0

0
greater than 0

The numeral in the ten thousandths position may be:

- ☐ 0
- ☐ greater than 0

0
greater than 0

7

72.

A camp has 3 water tanks, each with a capacity of 50.5 gallons. Each of 62 campers consumes .65 of a gallon of water per day. Find how often the tanks have to be refilled, to the nearest tenth of a day.

SOLVE the problem above:

number of tanks: 3
capacity of each tank: 50.5 gallons
number of campers: 62
consumption per day: .65 gallons

How often do the tanks have to be refilled, to the nearest tenth of a day?

multiplication
multiplication
division

3×50.5

$$\begin{array}{r} 50.5 \\ \times\ 3 \\ \hline 151.5 \end{array}$$

$62 \times .65$

$$\begin{array}{r} .65 \\ \times\ 62 \\ \hline 130 \\ 390 \\ \hline 40.30 \end{array}$$

$151.5 \div 40.3 = 1515 \div 403$

$$\begin{array}{r} 3.75 \\ 403\overline{)\,1515.00} \\ 1209 \\ \hline 3060 \\ 2821 \\ \hline 2390 \\ 2015 \\ \hline 375 \text{ (rem.)} \end{array}$$

$3.75 \rightarrow 3.8$ - answer

Time completed _____

YOU HAVE NOW FINISHED THE FIRST PART OF THIS LESSON. WRITE DOWN THE TIME. THEN, AFTER YOU HAVE REVIEWED THE MAIN IDEAS IN THE FOLLOWING SUMMARY, TAKE THE MASTERY TEST AT THE END OF THE BOOKLET.

12.

In the decimal fraction .2589, what is the numeral in the:

tenths place?	_____	2
hundredths place?	_____	5
thousandths place?	_____	8
ten thousandths place?	_____	9

In the decimal fraction .04, what is the numeral in the:

tenths place ?	_____	0
hundredths place?	_____	4

In the decimal fraction .7, what is the numeral in the:

tenths place?	_____	7

In the decimal fraction .7, is there a numeral:

in the hundredths place?

☐ yes
☐ no — no

in the thousandths place?

☐ yes
☐ no — no

in the ten thousandths place?

☐ yes
☐ no — no

8

71.

The safety limit for tonnage that can be off-loaded on a particular pier is fifty and six tenths tons. One shipment consists of two hundred crates that weigh thirty-two hundredths of a ton apiece. How many crates will have to be taken to a different pier?

SOLVE the problem above:

safety limit: 50.6 tons
shipment: 200 crates, at .32 ton apiece

How many crates will have to be taken to a different pier?

division
subtraction

$50.6 \div .32 = 5060 \div 32$

$$
\begin{array}{r}
158.1 \\
32 \overline{)\,5060.0} \\
\underline{32} \\
186 \\
\underline{160} \\
260 \\
\underline{256} \\
40 \\
\underline{32} \\
8 \text{ (rem.)}
\end{array}
$$

The pier can accommodate 158.1 crates. Since the shipper would not want a crate broken, 158.1 must be rounded to 158 crates.

$$
\begin{array}{r}
200 \\
- \underline{158} \\
42
\end{array}
$$

42 crates to be moved - answer

13. When there is no numeral for the number of hundredths, for the number of thousandths or for the number of ten thousandths in a decimal fraction, it means that the number of hundredths, thousandths, or ten thousandths can be written as 0. That is, the decimal fraction .1 is equal to the fraction .10 and zeros may be added indefinitely. WRITE the numeral for hundredths in the decimal fraction .6 _____ and for thousandths _____ and for ten thousandths _____.	0, 0 0
14. Suppose a person wanted to write the decimal fraction for thirty eight hundredths. In that case, he would write .38. That is, he would write the numeral 3 in the: ☐ first decimal place ☐ second decimal place ☐ third decimal place and the numeral 8 in the: ☐ first decimal place ☐ second decimal place ☐ third decimal place WRITE the decimal fraction for seventy-two hundredths: _____ WRITE the decimal fraction for four hundredths: _____	first decimal place second decimal place .72 .04

70.

The gasoline tank of a truck has a capacity of eighteen and fifty-five hundredths gallons. When it is taken to the station for filling, the tank contains four and thirty-three hundredths gallons. Each gallon of gas costs thirty-three and sixty-five hundredths cents. Find the cost of the gasoline needed to fill the tank, to the nearest cent.

SOLVE the problem above:

capacity of tank: 18.55 gallons

gasoline in tank: 4.33 gallons

cost of gallon: $.3365

What is the cost of the gasoline needed to fill the tank, to the nearest cent?

subtraction and multiplication

18.55 - 4.33

$$\begin{array}{r} 18.55 \\ -\ 4.33 \\ \hline 14.22 \end{array}$$

14.22 x $.3365

$$\begin{array}{r} 14.22 \\ \times\ .3365 \\ \hline 7110 \\ 8532 \\ 4266 \\ 4266 \\ \hline \$4.785030 \end{array}$$

$4.785030 → $4.79

$4.79 - answer

15. If a person wanted to write the decimal fraction for two hundredths and five thousandths, he would write .025. That is, in the first decimal place he would write the numeral _____. In the second decimal place he would write the numeral _____. And in the third decimal place he would write the numeral _____. WRITE the decimal fraction for three hundred and thirty-eight thousandths: _____ WRITE the decimal fraction for six thousandths: _____	 0 2 5 .338 .006
16. WRITE the decimal fractions for: five tenths _____ six hundred and eight thousandths _____ forty-five hundredths _____	 .5 .608 .45
17. WRITE the decimal fraction for each of the following phrases: sixty-two hundredths _____ one hundred and three thousandths _____ nine hundred and seventy-two thousandths _____ fourteen thousandths _____	 .62 .103 .972 .014

69.

A carpenter needs planking to cover the floor area of a room that is 20.25 feet long and 15.75 feet wide. 255 square feet of planking are already available. Find the square feet of additional planking that the carpenter needs, to the nearest tenth of a square foot.

SOLVE the problem above:

room: 20.25 x 15.75 feet

255 square feet of planking already available

How many square feet of additional planking are needed, to the nearest tenth of a square foot?

multiplication and subtraction

20.25 x 15.75

$$\begin{array}{r} 20.25 \\ \times\ 15.75 \\ \hline 10125 \\ 14175 \\ 10125 \\ 2025 \\ \hline 3189375 \end{array}$$

318.9375 - 255

$$\begin{array}{r} 318.9375 \\ -\ 255.0000 \\ \hline 63.9375 \end{array}$$

63.9375 ⟶ 63.9

63.9 square feet - answer

18. WRITE the decimal fractions that stand for: one tenth _____ ten hundredths _____ one hundred thousandths _____ one thousand ten thousandths _____	 .1 .10 .100 .1000
19. The decimal fractions .1, .10, .100, and .1000 are written as proper fractions below. SIMPLIFY these fractions as much as you can. $\frac{1}{10}$ $\frac{10}{100}$ $\frac{100}{1000}$ $\frac{1000}{10000}$ These fractions are all equal to: _____	 $\frac{1}{10}$ or .1
20. How many hundredths are equal to one tenth? _____ Thus, 3 hundredths would be: ☐ less than 1/2 of a tenth ☐ more than 1/2 of a tenth and 7 hundredths would be: ☐ less than 1/2 of a tenth ☐ more than 1/2 of a tenth What would 5 hundredths be? _____	 10 less than 1/2 of a tenth more than 1/2 of a tenth 1/2 of a tenth

68.

A cook has to make soup for 83 men. Each man consumes about 2 cups of soup, which is equivalent to .125 gallon. The cook has a number of pots that contain 2.4 gallons apiece How many pots will the cook have to use in order to make the soup?

SOLVE the problem above:

number of men: 83

soup consumed by each man:
.125 gallons

capacity of each pot: 2.4 gallons

How many pots will the cook have to use to make the soup?

multiplication and division

83 x .125

```
 .125
x 83
 375
1000
10.375
```

10.375 ÷ 2.4 = 103.75 ÷ 24

```
      4.32
   ------
24)103.75
   96
   ---
    77
    72
    --
     55
     48
     --
      7 (rem.)
```

The answer is 5 pots, because it's not possible to have .32 of a pot!

21. MATCH the columns below: A. exactly 1/2 of a tenth B. less than 1/2 of a tenth C. more than 1/2 of a tenth	1. _____1 hundredth 2. _____2 hundredths 3. _____3 hundredths 4. _____4 hundredths 5. _____5 hundredths 6. _____6 hundredths 7. _____7 hundredths 8. _____8 hundredths 9. _____9 hundredths	1. B 2. B 3. B 4. B 5. A 6. C 7. C 8. C 9. C
22. How many thousandths are equal to one hundredth? _____ MATCH the columns below: A. exactly 1/2 of a hundredth B. less than 1/2 of a hundredth C. more than 1/2 of a hundredth	1. _____1 thousandth 2. _____2 thousandths 3. _____3 thousandths 4. _____4 thousandths 5. _____5 thousandths 6. _____6 thousandths 7. _____7 thousandths 8. _____8 thousandths 9. _____9 thousandths	10 1. B 2. B 3. B 4. B 5. A 6. C 7. C 8. C 9. C

67.

The distance between a logging camp and a mill is thirteen and twenty-nine hundredths miles. A truck carrying logs consumes eighty-three thousandths of a gallon of gasoline per mile. Find the number of gallons consumed per trip, to the nearest hundredth of a gallon.

SOLVE the problem above:

distance to mill: 13.29 miles

gasoline consumed per mile: .083 gallons

What is the number of gallons consumed per trip, to the nearest hundredth of a gallon?

multiplication

.083 x 13.29

$$\begin{array}{r} 13.29 \\ \times \quad .083 \\ \hline 3987 \\ 10632 \\ \hline 1.10307 \end{array}$$

1.10307 $\longrightarrow$ 1.10 (or 1.1)

1.1 gallons - answer

23.

How many ten thousandths are equal to one thousandth?

_____

10

MATCH the columns below:

A. exactly 1/2 of a thousandth

B. less than 1/2 of a thousandth

C. more than 1/2 of a thousandth

1. _____ 1 ten thousandth	1. B
2. _____ 2 ten thousandths	2. B
3. _____ 3 ten thousandths	3. B
4. _____ 4 ten thousandths	4. B
5. _____ 5 ten thousandths	5. A
6. _____ 6 ten thousandths	6. C
7. _____ 7 ten thousandths	7. C
8. _____ 8 ten thousandths	8. C
9. _____ 9 ten thousandths	9. C

66.

Bob has $5.23. Bill has $3.18 more than Bob has, and Jim has $1.20 more than Bill. The three of them want to buy a part for a car that costs $25.50. How much more money do they need?

SOLVE the problem above:

Bob: $5.23
Bill: $3.18 more than Bob
Jim: $1.20 more than Bill

need: $25.50

How much more money do they need?

addition
subtraction

$ 5.23 Bob
5.23 } Bill
3.18 }
5.23 }
3.18 } Jim
1.20 }
$23.25

$25.50
-23.25
$ 2.25 - answer

24. Compare the decimal fraction .68 to the decimal fraction .6 and the decimal fraction .7. Since the number of hundredths in .68 is more than 1/2 of a tenth, the amount represented by .68 is nearest to the amount represented by: ☐ .6 ☐ .7	.7
Compare the decimal fraction .342 to the decimal fraction .34 and the decimal fraction .35. Since the number of thousandths in .342 is less than 1/2 of a hundredth, the amount represented by .342 is nearest to the amount represented by: ☐ .34 ☐ .35	.34
Compare the decimal fraction .5479 to the decimal fraction .547 and the decimal fraction .548. Since the number of ten thousandths in .5479 is more than 1/2 of a thousandth, the amount represented by .5479 is nearest to the amount represented by: ☐ .547 ☐ .548	.548
25. To which of the following is .41 nearest? ☐ .4 ☐ .5	.4
The fraction .884 is nearest to: ☐ .88 ☐ .89	.88
The fraction .2936 is nearest to: ☐ .293 ☐ .294	.294

64.

A man has twenty-one dollars and eighty-two cents and wants to buy five and sixty-five hundredths feet of iron pipe. Each foot of pipe costs fifty-two and three tenths cents. How much will the man have left after buying the pipe (to the nearest cent)?

SOLVE the problem above:

man: $21.82
pipe to be bought: 5.65 feet
cost per foot: $.523

How much will the man have left after buying the pipe?

multiplication

subtraction

$$\begin{array}{r} \$5.65 \\ \times\ .523 \\ \hline 1695 \\ 1130 \\ 2825 \\ \hline \$2.95495 \end{array}$$

$2.95495 \rightarrow 2.96$

$$\begin{array}{r} \$21.82 \\ -\ 2.96 \\ \hline \$18.86 \end{array}$$ answer

65.

PREVIEW FRAME

Several problems follow on which you will be able to practice the skills that you have acquired in this lesson.

NO RESPONSE REQUIRED

GO ON TO THE NEXT FRAME

26.

Consider the fraction .25. In this fraction, the number of hundredths is:

- ☐ less than 1/2 of a tenth
- ☐ more than 1/2 of a tenth
- ☐ exactly 1/2 of a tenth

exactly 1/2 of a tenth

The fraction .25 is:

- ☐ nearest to .2
- ☐ nearest to .3
- ☐ equally near to .2 and to .3

equally near to .2 and .3

The fraction .415 would be:

- ☐ nearest to .41
- ☐ nearest to .42
- ☐ equally near to .41 and to .42

equally near to .41 and .42

The fraction .8375 would be:

- ☐ nearest to .837
- ☐ nearest to .838
- ☐ equally near to .837 and to .838

equally near to .837 and .838

62.

A man has twenty-one dollars and eighty-two cents and wants to buy five and sixty-five hundredths feet of iron pipe. Each foot of pipe costs fifty-two and three tenths cents. How much will the man have left after buying the pipe?

When the decimal fractions in a problem are given to you in words, you must convert them to numbers when identifying the important facts of the problem.

For example, consider the problem above. STATE the important facts of the problem in a more useful way:

man: $21.82
pipe to be bought: 5.65 feet
cost per foot of pipe: $.523

63.

When identifying the important facts in a problem in which the decimal fractions are given in words, you:

- ☐ must convert the words to numbers
- ☐ need not convert the words to numbers

must convert the words to . . .

27.

Even though the fraction .25 is equally near to .2 and to .3, it is customary to think of .3 as the nearest number of tenths. Similarly, it is customary to think of .42 as the number of hundredths nearest to .415, and .838 as the number of thousandths nearest to .8375.

That is, when the number of hundredths in a decimal fraction is equal to exactly 1/2 of a tenth, the nearest number of tenths is considered to be:

- ☐ the higher number of tenths
- ☐ the lower number of tenths

the higher number of tenths

When the number of thousandths in a decimal fraction is equal to exactly 1/2 of a hundredth, the nearest number of hundredths is considered to be:

- ☐ the higher number of hundredths
- ☐ the lower number of hundredths

the higher number of hundredths

When the number of ten thousandths in a decimal fraction is equal to exactly 1/2 of a thousandth, the nearest number of thousandths is considered to be:

- ☐ the higher number of thousandths
- ☐ the lower number of thousandths

the higher number of thousandths

28.

What is the number of tenths nearest to .85?

- ☐ .8
- ☐ .9

.9

What is the number of hundredths nearest to .445?

- ☐ .44
- ☐ .45

.45

The number of thousandths nearest to .6355 is:

- ☐ .635
- ☐ .636

.636

61.

1. A carpenter needs a wooden brace to fit between two studs that are 16.35 inches apart. He has a piece of lumber 20.9 inches long from which to make the brace. After he makes the brace, how much lumber will he have left over?

2. A carpenter needs a wooden brace to fit between two studs that are sixteen and thirty-five hundredths inches apart. He has a piece of lumber twenty and nine tenths inches long from which to make the brace. After he makes the brace, how much lumber will he have left over?

Consider the problems given above. In each case, the problem is the same, except that it has been stated in a different form.

In the first case, the decimal fractions in the problem are given in:

- ☐ numbers
- ☐ words

In the second case, the decimal fractions are given in:

- ☐ numbers
- ☐ words

numbers

words

29.

In similar fashion, the number of hundredths nearest to a decimal fraction is determined by the numeral in the thousandths position only, regardless of any numerals farther to the right.

The number of thousandths nearest to a decimal fraction is determined by the numerals in the ten thousandths position only, regardless of any figures farther to the right.

What is the number of hundredths nearest to .3578?

- ☐ .35
- ☐ .36

.36

What is the number nearest to .3573?

- ☐ .35
- ☐ .36

.36

What is the number of thousandths nearest to .91846?

- ☐ .918
- ☐ .919

.918

What is the number nearest to .91842?

- ☐ .918
- ☐ .919

.918

60.

A truck consumes .076 gallons of gasoline per mile. Find the number of miles the truck travels when it consumes 18.55 gallons, to the nearest hundredth of a mile.

SOLVE the problem above:

gasoline consumption rate:
.076 gallons per mile

gasoline consumed: 18.55 gallons

How many miles does the truck travel?

division

18.55 ÷ .076 = 18550 ÷ 76

```
      244.078
76 ) 18550.000
     152
      335
      304
       310
       304
         60
          0
         600
         532
          680
          608
           72 (rem.)
```

244.078 → 244.08

244.08 - answer

30. Compare the decimal fractions .193 and .198. The number of hundredths in these fractions is: ☐ different ☐ the same and the number of thousandths is: ☐ different ☐ the same	 the same different
31. The number of tenths nearest to .193 is .2 and the number of tenths nearest to .198 is also .2, despite the fact that the number of thousandths varies. Thus, the number of tenths nearest to a decimal fraction is determined by: ☐ all the numerals to the right of the tenths position ☐ only the numeral in the hundredths position	 only the numeral in the...
32. What is the number of tenths nearest to .146? ☐ .1 ☐ .2 What is the number of tenths nearest to .141? ☐ .1 ☐ .2	 .1 .1

59.

Three trucks are each able to haul 1.75 tons of dirt from a construction site in one trip, and each truck is able to make three trips in one day. In the course of construction, 150 tons of dirt will be excavated. Find the number of days it will take to haul this dirt away, to the nearest tenth of a day.

The strategy that you have learned for solving word problems does not include rounding off as a step. Therefore, when a problem calls for you to round off the result, you must round off in addition to using the basic strategy.

For example, would the solution to the problem above be complete if you used only the basic strategy?

☐ yes
☐ no

no

Why not?

The result must be rounded off.

33.

Sometimes it is useful to change a decimal fraction that consists of more than one numeral to one that consists of only one numeral. This is accomplished by dropping all the numerals in the fraction except the numeral for tenths. When this is done, however, the resulting decimal fraction must be the one nearest to the original fraction.

For example, the fraction .41 may be changed to .4, the fraction .783 may be changed to .8, and the fraction .9217 may be changed to .9.

To which of the following would .36 be changed?

- ☐ .3
- ☐ .4

.4

To which of the following would the fraction .438 be changed?

- ☐ .4
- ☐ .5

.4

58.

A room has two walls that need painting. One wall measures 15.16 feet by 10.45 feet, and the other measures 13.15 feet by 10.45 feet. Find the square footage of wall space that needs painting, to the nearest tenth of a square foot.

SOLVE the problem above:

one wall: 15.16 x 10.45 feet

other wall: 13.15 x 10.45 feet

What is the square footage?

multiplication

addition

```
 15.16          13.15
x10.45         x10.45
  7580           6575
 6064           5260
15160          13150
158.4220       137.4175

 158.4220
+137.4175
 295.8395 - answer
```

Does this result have to be rounded off?

- ☐ yes
- ☐ no

yes

If yes, ROUND OFF the result as instructed:

295.8395 → 295.8

295.8 - answer

40

34.

Similarly, a fraction that consists of more than two numerals may be changed to one that consists of only two, and a fraction that consists of more than three numerals may be changed to one that consists of only three.

In each case, the procedure is one of dropping all the numerals to the right while making certain that the resulting fraction is the one nearest to the original.

For example, the fraction .567 may be changed to .57 and the fraction .9246 may be changed to .925.

To which of the following would .713 be changed?

- ☐ .71
- ☐ .72

.71

To which of the following would .4842 be changed?

- ☐ .484
- ☐ .485

.484

57.

Water flows from a pipe at the rate of 6.423 gallons per minute into a tank with a capacity of 95.17 gallons. Find the time it will take the pipe to fill the tank, to the nearest hundredth of a minute.

SOLVE the problem above. You may use the space below to write out the information that you need:

flow rate: 6.423 gallons per minute

tank capacity: 95.17 gallons

How long will it take the pipe to fill the tank?

division

$95.17 \div 6.423 = 95170 \div 6423$

```
      14.817
   ----------
6423 ) 95170.000
       6423
       30940
       25692
        52480
        51384
         10960
          6423
          45370
          44961
            409 (rem.)
```

14.817 - answer

Does the result have to be rounded off?

- ☐ yes
- ☐ no

yes

If yes, ROUND OFF the result as instructed:

14.817 → 14.82

35.

Reducing the number of numerals in a decimal fraction while making certain that the resulting fraction is the one nearest to the original is called rounding off.

Dropping all numerals except the one for tenths is called rounding off to the nearest tenth. Dropping all but the numerals for tenths and hundredths is called rounding off to the nearest hundredth, and dropping all but the numerals for tenths, hundredths and thousandths is called rounding off to the nearest thousandth.

ROUND OFF the fraction .68 to the nearest tenth:

- ☐ .6
- ☐ .7

.7

ROUND OFF the fraction .835 to the nearest hundredth:

- ☐ .83
- ☐ .84

.84

ROUND OFF the fraction .3262 to the nearest thousandth:

- ☐ .326
- ☐ .327

.326

56.

When asked to round off the result of dividing one decimal by another, you should carry the division out to:

- ☐ one place less than the place to which the result is to be rounded off
- ☐ one place more than the place to which the result is to be rounded off
- ☐ the place to which the result is to be rounded off

one place more . . .

36.

MATCH the columns below:

A. dropping all numerals except the numeral for tenths	1. _____ rounding off to the nearest hundredth	1. B, D
B. dropping all numerals except the numerals for tenths and hundredths	2. _____ rounding off to the nearest tenth	2. A, D
C. dropping all numerals except the numerals for tenths, hundredths and thousandths	3. _____ rounding off to the nearest thousandth	3. C, D
D. making certain that the resulting fraction is the one nearest to the original		

37.

What is the number of tenths just higher than .38? _____ What is the number of tenths just lower? _____ Which of these is the nearest number of tenths? _____

.4, .3
.4

What is the number of hundredths just higher than .835? _____ What is the number of hundredths just lower? _____ Which is the nearest number of hundredths? _____

.84
.83
.84

What is the number of thousandths just higher than .5653? _____ What is the number just lower? _____ Which is the nearest number? _____

.566, .565
.565

55.

In case you are asked to round the quotient off to the nearest hundredth, you must carry the division out to the nearest thousandths position. And, if you are asked to round the quotient off to the nearest thousandth, you must carry the division out to the ten thousandths position.

DIVIDE .3842 by .41, and ROUND OFF the result to the nearest hundredth:

Division:

$.3842 \div .41 = 38.42 \div 41$

```
      .937
   ---------
41) 38.420
    369
    ---
     152
     123
     ---
      290
      287
      ---
        3 (rem.)
```

Rounding off:

$.937 \rightarrow .94$

.94 - answer

DIVIDE .9753 by .24, and ROUND OFF the result to the nearest thousandth:

Division:

$.9753 \div .24 = 97.53 \div 24$

```
     4.0637
   ---------
24) 97.5300
    96
    --
     15
      0
      -
     153
     144
     ---
      90
      72
      --
     180
     168
     ---
      12 (rem.)
```

Rounding off:

$4.0637 \rightarrow 4.064$

4.064 - answer

38.

ROUND OFF each of the following to the nearest tenth:

.55	____	.6
.371	____	.4
.8299	____	.8

ROUND OFF each of the following to the nearest hundredth:

.555	____	.56
.2346	____	.23
.86489	____	.86

ROUND OFF each of the following to the nearest thousandth:

.6666	____	.667
.48311	____	.483

54.

In case you are asked to round off the result of dividing one decimal by another, you must carry the division out one place beyond the place to which the result will be rounded off.

For example, if you are asked to round the quotient off to the nearest tenth, you must carry the division out to the hundredths position.

DIVIDE .673 by .5, and ROUND OFF the result to the nearest tenth:

Division:

$.673 \div .5 = 6.73 \div 5$

$$
\begin{array}{r}
1.34 \\
5\overline{)\,6.73} \\
\underline{5} \\
17 \\
\underline{15} \\
23 \\
\underline{20} \\
3
\end{array}
$$

Rounding off:

$1.34 \rightarrow 1.3$

1.3 - answer

39. PREVIEW FRAME In previous lessons, you learned how to solve word problems that involve whole numbers or common fractions. In the following section, you will learn how to solve word problems that involve decimal fractions. NO RESPONSE REQUIRED	GO ON TO THE NEXT FRAME
40. REVIEW FRAME Below is a list of the steps that you learned for solving word problems that involve whole numbers or common fractions. The steps are listed alphabetically. NUMBER them in the order in which they should be performed: _____ decide which operation(s) should be performed _____ identify the important facts _____ read the problem _____ solve the problem _____ state the question that must be answered	 4 2 1 5 3

52. In some cases, after performing an operation with decimal fractions, you may be asked to round the result off to the nearest tenth, hundredth, or thousandth. For example, ADD .56 and .13: Now, ROUND OFF the result to the nearest tenth: SUBTRACT 1.47 from 2.53: ROUND OFF the result to the nearest tenth:	.56 +.13 .69 .7 2.53 -1.47 1.06 1.1
53. MULTIPLY .15 by .27: ROUND OFF the result to the nearest hundredth: MULTIPLY .98 by .22 ROUND OFF the result to the nearest thousandth:	.15 x.27 105 30 .0405 .04 .98 x.22 196 196 .2156 .216

41.

A carpenter needs a wooden brace to fit between two studs that are 16.35 inches apart. He has a piece of lumber 20.9 inches long from which to make the brace. After he makes the brace, how much lumber will he have left over?

The strategy that you learned for solving word problems with whole numbers or common fractions can also be used to solve word problems that involve decimal fractions.

For example, READ the problem above.

IDENTIFY the important facts in the problem:

wooden brace: 16.35 inches long.

piece of lumber: 20.9 inches long.

STATE the question that has to be answered:

How much lumber will the carpenter have left over?

DECIDE which operation(s) must be performed:

subtraction

How many operations are there? _____

1

SOLVE the problem:

$$\begin{array}{r} 20.90 \\ -\ 16.35 \\ \hline \end{array}$$

4.55 inches - answer

51.

In a supermarket, 4 lemons cost $.26 and 6 oranges cost $.39. A person decides to buy 1 lemon and 1 orange. How much will he spend? (Hint: Remember that a cashier always rounds off to the nearest penny.)

SOLVE the problem above, writing out the information that you need if you want to:

4 lemons: $.26
6 oranges: $.39
person to buy 1 lemon and 1 orange

How much will he spend?

two divisions and an addition

$.26 ÷ 4

$$4\overline{)\,.26} = .065$$

$.39 ÷ 6

$$6\overline{)\,.39} = .065$$

$.07
+.07
$.14

$.14 - answer

42.

A water tank with a capacity of 68.75 gallons must be emptied for a cleaning. Water flows out of the open tap at the rate of 5.5 gallons per minute. How long will it take to empty the tank?

Another problem is given above.

To solve the problem, the first step is to _____ the problem. Do this.

read

Now, IDENTIFY the important facts:

capacity of tank: 68.75 gallons

water flow: 5.5 gallons per minute.

STATE the question that has to be answered:

How long will it take to empty the tank?

DECIDE which operation(s) have to be performed:

division

How many operations have to be performed? _____

1

SOLVE the problem:

$68.75 \div 5.5 = 687.5 \div 55$

$$\begin{array}{r} 12.5 \\ 55\overline{)\,687.5} \\ \underline{55} \\ 137 \\ \underline{110} \\ 275 \\ \underline{275} \\ 0 \end{array}$$

12.5 minutes - answer

50.

LIST in order the steps necessary to solve a word problem in arithmetic:

read the problem

identify the important facts

state the question that has to be answered

decide which operation(s) is/are needed

solve the problem

43.

A painter needs 5 gallons of paint to paint a house. Each gallon costs $1.25. What will be the total cost of the paint?

The first step is to _____. Do this.

read the problem

The second step is to identify the important _____. Do this:

facts

5 gallons of paint needed

cost of each gallon: $1.25

STATE the question that has to be answered:

What will be the total cost of the paint?

DECIDE which operation(s) have to be performed:

multiplication

How many operations are there? _____

1

SOLVE the problem:

$1.25
x 5
$6.25 - answer

49.

A car is able to travel 16.7 miles per gallon of gasoline. Its tank capacity is 17.4 gallons. It must make a trip of 433.2 miles. How many tankfuls of gasoline will be required?

Do the first four steps necessary to solve this problem, writing down information as you would like:

mileage rate: 16.7 miles per gallon

tank capacity: 17.4 gallons

trip: 433.2 miles

How many tankfuls of gasoline will be required?

two divisions

The last step is to _____ the problem. Do this:

solve

$433.2 \div 16.7 = 4332 \div 167$

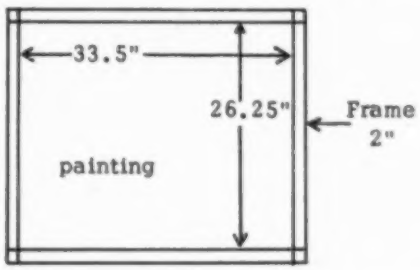
$$
\begin{array}{r}
25.94 \\
167\overline{)4332.0} \\
\underline{334} \\
992 \\
\underline{835} \\
1570 \\
\underline{1503} \\
670 \\
\underline{668} \\
2 \text{ (rem.)}
\end{array}
$$

$25.94 \div 17.4 = 259.4 \div 174$

$$
\begin{array}{r}
1.49 \\
174\overline{)259.40} \\
\underline{174} \\
854 \\
\underline{696} \\
1580 \\
\underline{1566} \\
14 \text{ (rem.)}
\end{array}
$$

1.49 tankfuls - answer

44.



Two sides of a painting are each 33.5 inches long, and the other two sides are each 26.25 inches long. The frame is two inches wide. How many inches of wood are used in this frame?

Do the first step.

The second step is to _____. Do this:

pick out the important facts

two sides of the painting:
each 33.5 inches long

the other two sides:
each 26.25 inches long

the width of the frame:
2 inches wide

The third step is to state the _____ that has to be answered. Do this:

question

How many inches of wood are used in this frame?

DECIDE which operation(s) is/are necessary:

multiplication
addition

How many operations are needed? _____

2

SOLVE the problem:

33.5	26.25	2
x 2	x 2	x 4
67.0	52.5	8

67.0 (two sides)
52.5 (the other two sides)
8.0 (the four corners)
127.5 inches

127.5 inches - answer

48.

Two containers must be filled with water: one has a capacity of 4.25 gallons and the other has a capacity of 3.35 gallons. The water is to be taken from a tank that contains 15.5 gallons of water. How much water will be left in the tank after the containers are filled?

Do the first three steps necessary to solve this problem, writing down information as you would like:

two containers: one with capacity of 4.25 gallons, the other with capacity of 3.35 gallons.

tank: containing 15.5 gallons of water.

How much water will be left in the tank after the containers are filled?

The fourth step is to _____. Do this:

decide which operation(s) is/are needed

addition
subtraction

SOLVE the problem:

$$\begin{array}{r} 4.25 \\ +3.35 \\ \hline 7.6 \end{array} \qquad \begin{array}{r} 15.5 \\ -7.6 \\ \hline 7.9 \end{array}$$

7.9 gallons - answer

45.

A typist is able to type 100 words in 1.6 minutes. How many minutes will it take her to type a letter that is 250 words long?

Do the first two steps necessary to solve this problem. You may write down the required information if you like:

typist's rate: 100 words in 1.6 minutes.
letter: 250 words long

The third step is to _____. Do this

state the question that has to be answered

How many minutes will it take her to type the letter?

The fourth step is to decide which _____ have to be performed. Do this:

operation(s)

There are two ways to solve this problem. One involves a division and a multiplication. The other involves two divisions.

SOLVE the problem:

1) division and multiplication

$250 \div 100$

$$100\overline{)250.0} = 2.5$$

200
500
500
0

2.5×1.6

$$\begin{array}{r} 2.5 \\ \times 1.6 \\ \hline 150 \\ 25 \\ \hline 4.00 \end{array}$$

- answer

2) two divisions

$100 \div 1.6 = 1000 \div 16$

$$16\overline{)1000.0} = 62.5$$

96
40
32
80
80
0

$250 \div 62.5 = 2500 \div 625$

$$625\overline{)2500.00} = 4.$$

2500
0

4 minutes - answer

46. On the basis of the previous frames, it is clear that a problem is: ☐ always solvable by more than one method ☐ always solvable by one method only ☐ sometimes solvable by one method only, sometimes by more than one method	sometimes solvable by . . .
47. FOOTNOTE FRAME In case of a problem in succeeding frames that can be solved by more than one method, only one method of solution will be shown. If your method of solution is different, you can determine its correctness by checking your result against the result obtained by the other method. NO RESPONSE REQUIRED	GO ON TO THE NEXT FRAME

PM 431 - 27

ADVANCED GENERAL EDUCATION PROGRAM

A HIGH SCHOOL SELF-STUDY PROGRAM

ED 069988

SOLVING PERCENTAGE WORD PROBLEMS

LEVEL: I

UNIT: 8

LESSON: 3

U.S. DEPARTMENT OF LABOR
MANPOWER ADMINISTRATION, JOB CORPS
NOVEMBER 1969

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1. PREVIEW FRAME You have learned in previous lessons that: A. Percentage word problems have three parts to them: 1. total 2. part 3. percent B. In a percentage word problem, one part will be missing. C. To solve a percentage word problem: 1. read the problem 2. decide what is missing 3. write the problem 4. find the missing value The frames that follow will review this and give you practice in solving more difficult percentage word problems. NO RESPONSE REQUIRED	GO ON TO THE NEXT FRAME
2. READ this problem: Fred has 75 coins in his collection. 12% of the coins are gold. How many are gold? What is missing: ☐ total ☐ part ☐ percent Which is the correct way to write the problem? ☐ 75 = 12% x X ☐ 12% x 75 = X ☐ 75 x X = 12%	part 12% x 75 = X

1

7. Jane saves $50 per month. Her annual income is $5000 ; what percent of her income does she save?

8. Susan bought a dress at a 20% reduction sale. If she paid $18 for it, what was the regular price?

Time completed _____

WHEN YOU HAVE FINISHED THIS TEST, WRITE DOWN THE TIME. THEN TAKE THE LESSON TO YOUR INSTRUCTOR OR HIS ASSISTANT FOR CHECKING. WAIT UNTIL THE LESSON IS APPROVED BEFORE GOING ON TO THE NEXT LESSON.

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3. The problem is correctly written as: 12% x 75 = X Now, SOLVE the problem:	75 x .12 150 75 9.00 9 coins - answer
4. READ this problem: Joanne bought a $35.00 dress at a 25% discount. How much was the discount? What is missing? ☐ total ☐ part ☐ percent The correct way to write this problem is: ☐ 25% x $35 = X ☐ $35 = 25% x X ☐ X x $35 = 25%	part 25% x $35 = X
5. The problem is correctly written as: 25% x $35 = X Now, SOLVE the problem:	$35 x .25 175 70 $8.75 - answer

1. A used car dealer bought a car for $450 and then sold it for $500. What percentage of the selling price was profit?

2. A man bought a car for $2800. If he were to sell it after one year he would only get $2100 for the car. What is the percentage decrease in value of the car?

3. A party nut mixture contains 12% peanuts. How many pounds of peanuts are there in 25 pounds of the mixture?

4. If the sale price of a television after 25% reduction is $185, what was the original price of the set?

5. Of 150 students, 62% were male. How many of the 150 students were males? How many were females?

6. John earns $280 per month. Several deductions are taken from his pay check: 14% withholding tax, 3 5/8% social security, and 3% state tax. What is his take-home pay?

6. REFER TO PREVIOUS TWO FRAMES If you wanted to know how much Joanne paid for the dress, you would: ☐ add the discount to the regular price ☐ divide the regular price by the discount ☐ multiply the regular price by the discount ☐ subtract the discount from the regular price	subtract the discount from . . .
7. The regular price of the dress that Joanne bought was $35.00 and the discount was $8.75. What was the final price?	$35.00 - 8.75 $26.25 $26.25 - answer
8. The distance between Boston and New York is 200 miles. The distance between Philadelphia and New York is 55% less than the distance between Boston and New York. How far is it from Philadelphia to New York. What is missing? ☐ part ☐ percent ☐ total Which is the correct way to write this problem? ☐ 200 = 55% x X ☐ 55% x 200 = X ☐ 55% x 200 = X 200 - X = distance	part 55% x 200 = X 200 - X = distance

MASTERY TEST

Time started _____

9. The problem is written correctly as: 55% x 200 = X 200 - X = distance SOLVE the problem:	200 x .55 1000 1000 110.00 200 - 110 90 90 miles - answer
10. A sack of potatoes was found to weigh 15% less than its marked weight of 35 pounds. How much did the sack weigh? What is missing? ☐ part ☐ percent ☐ total WRITE the problem:	part 15% x 35 = X 35 - X = weight

31.

Ray bought a car for $1500. This price included a 20% state tax. How much would the car have cost without the tax?

SOLVE the problem above:

total price = 100% + 20% = 120%

120% x X = $1500

$$
\begin{array}{r}
1250.00 \\
120)\overline{150000.00} \\
\underline{120} \\
300 \\
\underline{240} \\
600 \\
\underline{600} \\
0
\end{array}
$$

$1250 - answer

Time completed _____

YOU HAVE NOW FINISHED THE FIRST PART OF THIS LESSON. WRITE DOWN THE TIME. THEN, AFTER YOU HAVE REVIEWED THE MAIN IDEAS IN THE FOLLOWING SUMMARY, TAKE THE MASTERY TEST AT THE END OF THE BOOKLET.

11. The problem is written correctly as: 15% x 35 = X 35 - X = weight SOLVE the problem:	35 x.15 175 35 5.25 35.00 -5.25 29.75 29.75 lbs. - answer
12. By the end of his vacation Harry's weight had increased 10% above his original weight of 155 pounds. How much did Harry weigh after the increase? What is missing? ☐ part ☐ percent ☐ total WRITE the problem:	total 10% x 155 = X 155 + X = total weight

30.

A diamond ring costs $950 with a 15% luxury tax included. What would the ring cost without the tax?

Considering that a price without a tax is 100%, the total price is _____.

115%

Therefore, the price of the ring without the 15% luxury tax is _____.

$115\% \times X = \$950$

$X = \frac{\$950}{115\%}$ $X = \frac{\$950.00}{1.15}$

```
      826.086
115) 95000.000
     920
      300
      230
       700
       690
        100
          0
        1000
         920
          800
          690
          110 (rem.)
```

826.086 → 826.09

$826.09 - answer

13.

The problem is written as:

10% x 155 = X
155 + X = total weight

SOLVE the problem:

155
.10
15.50

155.00
15.50
170.50

170.50 pounds - answer

14.

After his vacation Harry's wife put him on a strict diet. His weight (170.5 pounds) decreased by 10% in two weeks.

After the diet Harry weighed (☐ more or ☐ less) than 155 pounds?

less

How much less than his original weight did he weigh?

170.5
.10
17.05

170.50
-17.05
153.45

155.00
-153.45
1.55

1.55 pounds less - answer

29.

READ this problem:

> The total price of a fur coat is $880 with a 10% sales tax included. How much would the price be without the tax?

To solve a problem such as this, you must first realize that a price without a tax is 100%.

Therefore, in this case, the <u>total</u> price is 100% + 10%.

100% + 10% = _____%?

110%

In dollars, the total price is $880. Therefore with X standing for the price without the tax, the problem can be written as follows:

$$110\% \times X = \$880 \quad \text{or} \quad X = \frac{\$880}{110\%}$$

CHANGE 110% to a decimal: _____

1.10

Now, SOLVE the problem:

$$\frac{880.00}{1.10}$$

$$110 \overline{)\,88000.00} \quad 800.00$$

$$-\,880$$

$$000$$

$800 - answer

15.

Out of 1400 students, 19% were under 21 years of age. How many were 21 or over?

$$\begin{array}{r} 1400 \\ .19 \\ \hline 12600 \\ 1400 \\ \hline 266.00 \end{array} \qquad \begin{array}{r} 1400 \\ -266 \\ \hline 1134 \end{array}$$

1134 students over 21 - answer

16.

Susan earns $190 per month. 14% is deducted from her check for income tax, 3% for state tax and 2 2/5% for disability. What is Susan's take-home pay and how much is each deduction?

To solve the problem above, first change all percents to decimals:

14% = _____ .14

3% = _____ .03

2 2/5% = _____ .024

17.

REFER TO PREVIOUS FRAME

MULTIPLY each decimal by $190.

190 x .14 = $26.60 income tax

190 x .03 = $ 5.70 state tax

190 x .024 = _____ + $ 4.56 disability

$36.86

How much is deducted from her paycheck? _____

190.00
-36.86

What is Susan's take-home pay? _____

$153.14 take-home pay - answer

27. Richard paid $36 for a suit that was reduced by 10%. What was the regular price? Considering that the regular price was 100%, what was the percent of the regular price that Richard paid? _____ Now, SOLVE the problem:	100% - 10% = 90% - answer 90% x X = $36 $X = \frac{\$36}{90\%}$ 40.00 9) 360.00 $40.00 answer
28. $48 is the sale price of an object; it was reduced by 25%. What was the regular price?	$X = \frac{\$48}{75\%}$ 64.00 75) 4800.00 450 300 300 00 0 0 $64.00 - answer

18.

The Philly Fumblers, a local softball team, was scheduled to play 60 games last season. The team lost 55% of the games, tied 15% of the games, and forgot to show up for 5% of the games. They won the remaining games.

How many games did they win?

55% = .55
15% = .15
5% = .05
.75

60
x.75
300
420
45.00 - games didn't win

60
-45
15

15 games won - answer

25. Lou spends $45.00 for rent. He makes $180 per month. What percent of his income goes for rent?	$\frac{.25}{180)45.00} = 25\%$ 25% - answer
26. READ this problem: Letty bought a dress at a 20% reduction sale. If she paid $8.00 for it, what was the regular price? To solve a problem such as this, you must first realize that a regular price is 100%. Therefore, 100% - 20% is the percent of the regular price that Letty paid. What percent of the regular price did Letty pay? _____ In dollars, the amount Letty paid was $8.00. Therefore, with X standing for the regular price, the problem can be written as follows: $80\% \times X = \$8.00$ or $X = \frac{\$ 8.00}{80\%}$ CHANGE 80% to a decimal: _____ Now, SOLVE the problem:	80% .8 $\$8.00 \div .8 = \$80 \div 8 = \$10.00$ $10.00 regular price - answer

19. Jerry bought a radio set for $7.20. He repaired it and sold it for $18.00. What percent of his selling price was profit? To solve a problem such as the one above, you must first determine the profit in dollars. In this case, the profit was $18.00 - $7.20, or _____ .	$10.80
20. REFER TO PREVIOUS FRAME After determining the profit in dollars, you can convert it to a percent. The proper way to write the problem to determine the percent profit would be: ☐ X x $18.00 = $10.80 ☐ X x $10.80 = $18.00 ☐ $18.00 x $10.80 = X	X x $18.00 = $10.80
21. REFER TO PREVIOUS FRAME Correctly written, the problem is: X x $18.00 = $10.80, or X = $\frac{\$10.80}{\$18.00}$ SOLVE the problem:	$10.80 ÷ $18.00 = 1080 ÷ 1800 .60 = 60% 1800) 1080.00 1080 0 00 0 0 60% - answer

22.

Bob built a lamp for $10 and sold it for $12.50. What percent of the selling price was profit?

$12.50 - $10 = $2.50

X x $12.50 = $2.50

$X = \frac{\$\ 2.50}{\$12.50}$

$$1250\overline{)250.00} = .20 = 20\%$$

2500

00

0

0

20% - answer

23.

In a class of 56 students, 7 are girls. What percent of the students are girls?

The proper form for this problem is:

- ☐ X x 56 = 7
- ☐ 7 x 56 = X
- ☐ 7 x X = 56

X x 56 = 7

24.

REFER TO PREVIOUS FRAME

What percent of the students are girls?

$$56\overline{)7.000} = .125 = 12.5 \text{ or } 12\ 1/2\%$$

56

140

112

280

280

0

12 1/2% - answer

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